

Fabrication Techniques for active Photonic Crystal devices

L O'Faolain, S Moore, M A Cataluna, N Tripathi, M V Kotlyar, R Wilson and T F Krauss.
University of St Andrews, North Haugh, St Andrews, Fife, UK.

Hydrogen Silsesquioxane Masking for Photonic Crystal Fabrication.

The use of a spin-on glass (Hydrogen Silsesquioxane- HSQ) [1] as a mask for the etching of photonic crystals has a number of advantages relative to the more usual silica mask deposited using Plasma Enhanced Chemical Vapour Deposition. Not only is it a very cheap and versatile process with an etch resistance comparable to that of PEVCD silica, it is also less damaging to the electrical properties of the device. This is particularly important for active devices in which heating should be minimised [2].

Low Sidewall recombination In Quantum Dot Lasers

Due to the high confinement of carriers to quantum dots, carrier recombination at exposed surfaces is greatly reduced [3]. Thus, the active layer may be etched through with little loss in performance, allowing the advantages of high refractive index contrasts to be accessed. From lasers fabricated in Quantum Dot material grown by NL Nanosemiconductor GmbH, we measure threshold current densities for narrow devices that are more than an order of magnitude better than those from comparable quantum well devices. This makes Quantum Dots an ideal material for the realisation of active photonic crystal devices.

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